510(k) SUBSTANTIAL EQUIVALENCE DETERMINATION
DECISION SUMMARY
ASSAY ONLY TEMPLATE

A. 510(k) Number:

K050062

B. Purpose for Submission:

Premarket notification to add gemifloxacin to the BBL Sensi-Disc product line

C. Measurand:

Gemifloxacin 5µg/mL

D. Type of Test:

Semi-quantitative Antimicrobial Susceptibility Test Disc

E. Applicant:

Becton Dickinson and Company

F. Proprietary and Established Names:

Gemifloxacin 5µg, BBL Sensi-Disc Antimicrobial Susceptibility Test Disks

G. Regulatory Information:

1. Regulation section:

   866.1620 Antimicrobial Susceptibility Test Disc

2. Classification:

   II

3. Product code:

   JTN- Susceptibility Test Disc, Antimicrobial

4. Panel:

   83 Microbiology

H. Intended Use:

1. Intended use(s):

   These discs are used for semi-quantitative *in vitro* susceptibility testing by the agar disc diffusion test procedure of common, rapidly growing and certain fastidious bacterial pathogens. These include the *Enterobacteriaceae, Staphylococcus spp., Pseudomonas spp., Acinetobacter spp., Enterococcus spp., Vibrio cholerae* and, by modified procedures, *Haemophilus infuenzae, Neisseria gonorrhoeae, Streptococcus pneumoniae* and other streptococci.

2. Indication(s) for use:

   Use of Gemifoxacin 5µg, BBL Sensi-Disc for in vitro agar diffusion susceptibility testing is indicated when there is a need to determine the susceptibility of bacteria to gemifloxacin. 5µg has been shown to be active in vitro against most strains of microorganisms listed below, as described in the FDA approved drug insert for this antimicrobic.

   Active *In Vitro* and in clinical infections against:
   Streptococcus pneumoniae (including multi-drug resistant strains)
   Haemophilus influenzae
   Haemophilus parainfluenzae
   Klebsiella pneumoniae (many strains are only moderately susceptible)
   Active *In Vitro* against:
   Staphylococcus aureus (methicillin-susceptible strains only)
   Streptococcus pyogenes
   Acinetobacter lwoffi
   Klebsiella oxytoca
   Proteus vulgaris

3. Special conditions for use statement(s):

   Gemifloxacin exhibits *in vitro* minimal inhibitory concentrations of 0.25 µg/mL or less against most (> 90%) strains of the following microorganisms; however, the safety and effectiveness of gemifloxacin in treating clinical infections due to these microorganisms has not been established in adequate and well controlled clinical trials: *Staphylococcus aureus* (methicillin-susceptible strains only), *Streptococcus pyogenes, Acinetobacter lwoffi, Klebsiella oxytoca, Proteus vulgaris*.

   For *Streptococcus pneumoniae*, use Mueller-Hinton Agar with 5% Sheep Blood. For *Haemophilus influenzae* use Haemophilus Test Medium Agar.

   For Prescription Use only.

4. Special instrument requirements:

None

I. Device Description:

Gemifloxacin 5µg BBL Sensi-Disc is prepared by impregnating high quality paper with accurately determined amounts of gemifloxacin supplied by the drug manufacturer. Each gemifloxacin disk is clearly marked on both sides with the agent (GEM) and drug content (5 µg). Gemifoxacin cartridges each contain 50 impregnated disks that are paced as either a single cartridge in a single box, or in a package containing ten cartridges. Gemifloxacin disks are used for semi-quantitative *in vitro* susceptibility evaluations by the agar diffusion test method.

J. Substantial Equivalence Information:

1. Predicate device name(s):

   Ciprofloxacin 5µg, BBL Sensi-Disc

2. Predicate 510(k) number(s):

   K874425

3. Comparison with predicate:

Similarities		
Item	Device	Predicate
Intended use	an *in vitro* diagnostic product for clinical susceptibility testing of gram positive organisms.	same
Inoculum	Pure cultures of bacterial isolates	same
Inoculation method	Direct equated to a 0.5 McFarland	same

Differences		
Item	Device	Predicate
Antibiotic	Gemifloxacin	Ciprofloxacin

K. Standard/Guidance Document Referenced (if applicable):

The Center for Drug Evaluation and Review (CDER) pharmaceutical approved package insert, developed during clinical trial studies, was used for Interpretive

Criteria and QC expected Ranges.

L. Test Principle:

Disks containing a wide variety of antimicrobial agents are applied to the surface of Mueller Hinton Agar plates (or Haemophilus Test Medium Agar for Haemophilus influenzae or Mueller Hinton Agar with 5% Sheep Blood for Streptococcus species) inoculated with pure cultures of clinical isolates (Bauer-Kirby method). Following incubation, the plates are examined and the zones of inhibition surrounding the disks are measured and compared with established zone size ranges for individual antimicrobial agents in order to determine the agent(s) most suitable for use in antimicrobial therapy. The categorical interpretation [susceptible (S), intermediate (I), or resistant (R)] for the organism being tested with the antimicrobial agent is made by comparing zone diameters to those found in the respective organism tables of NCCLS Document M2 ("Performance Standards for Antimicrobial Disk Susceptibility Tests) and of NCCLS Document M100 ("Performance Standards for Antimicrobial Susceptibility Testing").

M. Performance Characteristics (if/when applicable): (Descriptive characteristics were sufficient for this disc, because the drug studies, evaluated by CDER, generated the Interpretive Criteria and QC expected Ranges used for review of this device.)

1. Analytical performance:

   a. Precision/Reproducibility:

   Not applicable (N/A)

   b. Linearity/assay reportable range:

   N/A

   c. Traceability, Stability, Expected values (controls, calibrators, or methods):

   N/A

   d. Detection limit:

   N/A

   e. Analytical specificity:

   N/A

   f. Assay cut-off:

N/A

2. Comparison studies:

   a. Method comparison with predicate device:

   N/A

   b. Matrix comparison:

   N/A

3. Clinical studies:

   a. Clinical Sensitivity:

   N/A

   b. Clinical specificity:

   N/A

   c. Other clinical supportive data (when a. and b. are not applicable):

   N/A

4. Clinical cut-off:

   N/A

5. Expected values/Reference range:

   Enterobacteriaceae $\geq$ 20 (S), 16-19 (I), $\leq$ 15 (R)

   Streptococcus pneumoniae $\geq$ 23 (S), 20-22 (I), $\leq$ 19 (R)

   Haemophilus spp. $\geq$ 18 (S)

   The Interpretative criteria in the manufacturer's instructions for use are the same as recommended by the FDA/CDER in the approved pharmaceutical package insert. The manufacturer's QC isolates and ranges also match the approved pharmaceutical package insert but also include QC ranges for *P. aeruginosa* or *S. aureus* that are absent from the pharmaceutical package insert but match what is recommended by NCCLS. All values will be included in the device package insert.

For some organism/antimicrobial combinations, the absence of data on resistant strains precludes defining any results other than "Susceptible". Strains yielding MIC results suggestive of a "non-susceptible" category should be submitted to a reference laboratory for further testing.

N. Proposed Labeling:

The labeling is sufficient and it satisfies the requirements of 21 CFR Part 809.10.

O. Conclusion:

1. The submitted information in this premarket notification is complete and supports a substantial equivalence decision.

P. Other Supportive Device and Instrument Information:
Gemifloxacin has *in vitro* activity against a wide range of Gram-negative and Gram-positive microorganisms. Gemifloxacin is bactericidal with minimum bactericidal concentrations generally within one dilution of the minimum inhibitory concentrations. Gemifloxacin acts by inhibiting DNA synthesis through the inhibition of both DNA gyrase and topoisomerase IV, which are essential for bacterial growth. The NCCLS includes gemifloxacin for testing in Table 1 "Suggested Groupings of U.S. FDA approved antimicrobial agents that should be considered for routine testing and reporting…" for *Haemophilus spp*., *S. pneumoniae*, and *Streptococcus spp.* other than *S. pneumoniae*.

The QC range and interpretative criteria for disc Antimicrobial Susceptibility Test testing is determined at the time of drug approved by CDER. No further testing is needed as long as the drug concentration and ranges are the same as in the gemifloxacin approval of the final package insert. All values will be included in the final package insert. Below is an example showing the recommended QC organisms and values that should be obtained if testing is performed according to the NCCLS recommendations.

ANTIBIOTICS	**CONCENTRATIONS (μg/mL)**	
	FDA SIR	**NCCLS SIR**
Gemifloxacin	*Enterobacteriaceae* ≥ 20 (S), 16-19 (I), ≤ 15 (R) *Streptococcus pneumoniae* ≥ 23 (S), 20-22 (I), ≤ 19 (R) *H. influenzae and H. parainfluenzae* ≥ 18 (S)	*Enterobacteriaceae* NA *Streptococcus pneumoniae* ≥ 23 (S), 20-22 (I), ≤ 19 (R) *Haemophilus spp.* ≥ 18 (S)
	QC organisms	
E. coli ATCC 25922	29-36	29-36
P. aeruginosa ATCC 27853	NA	19-25
S. aureus ATCC 25923	NA	27-33
S. pneumoniae ATCC 49619	28-34	28-34
H. influenzae ATCC 49247	30-37	30-37

Q. Administrative Information:

1. Applicant contact information:

   a. Name of applicant:

   Becton Dickinson and Company

   b. Mailing address:

   7 Loveton Circle

   Sparks, MD 21152

   c. Phone #:

   410-316-4206

   d. Fax #:

   410-316-4499

   e. E-mail address (optional):

   None given

   f. Contact:

   Bradford M. Springs, Manager, Regulatory Affairs

2. Review documentation:
   The submission was received in the DMC on January 11, 2005. The submission includes the, Truthful and Accuracy form, Indications for Use Statement and a 510k Summary.

   One February 01, 2005, I phoned Brad Springs to request that he send a new indications for use page. I asked that he remove *Legionella pneumophilia* because the BBL Sensi-Discs were not cleared for that organism and because NCCLS does not give any testing method for *L. pneumophilia*. I also asked that he condense the IU down to one page, include a check mark in the prescription use blank and update the IU in the rest of the document. The add-to-file was received in DMC on February 03, 2005 and given the number K050062/A001. I

received these documents on the 7th. The information was corrected as I requested. I also suggested that during the next reprint of the devices package insert BD consider changing references of NCCLS to their new name, CLSI.

R. Reviewer Name and Signature:

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Tara Goldman
CDRH/OIVD/DMD